

Having described the invention, the following is claimed:

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1. An apparatus for supporting an endoscope that extends through a cannula for viewing a surgical site in a patient during surgery on the patient, said apparatus comprising:

a base for association with the cannula, said base having a guide portion;

a first part adapted to be fixed to the endoscope;

a second part engaging said guide portion and being movable relative to said guide portion, said first and second parts being movable together relative to said guide portion; and

a mechanism connected between said base and said second part for moving said first and second parts relative to said guide portion to change a position of the endoscope relative to the patient.

2. The apparatus as set forth in claim 1 further including a cannula retainer for engaging an outer surface of the cannula to secure the cannula to said cannula retainer, said cannula retainer including a

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ing for engaging a groove in the outer surface of the cannula and a sleeve secured to the proximal end of the cannula.

The apparatus as seen in FIG. 1 includes a sleeve 10 having a proximal end 12 and a distal end 14. The sleeve 10 is secured to the proximal end of the cannula 20 by a connection 16. The connection 16 includes an annular flange 18 secured between said base 22 and said sleeve 10. The sleeve 10 is secured to said base 22 at incremental intervals 24 relative to said sleeve 10.

The apparatus as seen in FIG. 2 includes a cannula retainer 30 including a proximal end 32 and a distal end 34. The proximal end 32 of the cannula retainer 30 is secured to the proximal end of the cannula 20, and the distal end 34 of the cannula retainer 30 is relatively rotatable about the proximal end 32 of the cannula retainer 30.

The apparatus as seen in FIG. 3 includes a sleeve 40 having an annular recess 42 at its proximal end 44. The proximal end 44 of the sleeve 40 is secured to the proximal end of the cannula 20, and the distal end 46 of the sleeve 40 is secured to the proximal end of the cannula 20. The sleeve 40 is secured to the proximal end of the cannula 20 by a lip extending radially outwardly from the proximal end of the cannula 20.

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The apparatus as seen in FIG. 2 includes a cannula retainer 30 including a proximal end 32 and a distal end 34. The proximal end 32 of the cannula retainer 30 is secured to the proximal end of the cannula 20, and the distal end 34 of the cannula retainer 30 is relatively rotatable about the proximal end 32 of the cannula retainer 30.

The apparatus as seen in FIG. 3 includes a sleeve 40 having an annular recess 42 at its proximal end 44. The proximal end 44 of the sleeve 40 is secured to the proximal end of the cannula 20, and the distal end 46 of the sleeve 40 is secured to the proximal end of the cannula 20. The sleeve 40 is secured to the proximal end of the cannula 20 by a lip extending radially outwardly from the proximal end of the cannula 20.

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The apparatus as seen in FIG. 2 includes a cannula retainer 30 including a proximal end 32 and a distal end 34. The proximal end 32 of the cannula retainer 30 is secured to the proximal end of the cannula 20, and the distal end 34 of the cannula retainer 30 is relatively rotatable about the proximal end 32 of the cannula retainer 30.

The apparatus as seen in FIG. 3 includes a sleeve 40 having an annular recess 42 at its proximal end 44. The proximal end 44 of the sleeve 40 is secured to the proximal end of the cannula 20, and the distal end 46 of the sleeve 40 is secured to the proximal end of the cannula 20. The sleeve 40 is secured to the proximal end of the cannula 20 by a lip extending radially outwardly from the proximal end of the cannula 20.

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The apparatus as seen in FIG. 2 includes a cannula retainer 30 including a proximal end 32 and a distal end 34. The proximal end 32 of the cannula retainer 30 is secured to the proximal end of the cannula 20, and the distal end 34 of the cannula retainer 30 is relatively rotatable about the proximal end 32 of the cannula retainer 30.

The apparatus as seen in FIG. 3 includes a sleeve 40 having an annular recess 42 at its proximal end 44. The proximal end 44 of the sleeve 40 is secured to the proximal end of the cannula 20, and the distal end 46 of the sleeve 40 is secured to the proximal end of the cannula 20. The sleeve 40 is secured to the proximal end of the cannula 20 by a lip extending radially outwardly from the proximal end of the cannula 20.

6. The apparatus as set forth in claim 4 further including a sleeve retainer for supporting said base and said sleeve, said sleeve retainer including a member press fit onto an end portion of said sleeve.

7. The apparatus as set forth in claim 1 further including a sleeve for engaging the cannula and a support arm for securing said sleeve to a support structure, said support arm including a first portion for connection to said sleeve and a second portion for interconnecting said first portion and the support structure, said first portion comprising an electrically insulating material electrically insulating said sleeve from said second portion.

8. The apparatus as set forth in claim 1 wherein said first part includes at least one rail member for slidably engaging a guide track of said second part.

9. The apparatus as set forth in claim 1 further including a cylindrical sleeve for receiving the cannula, said sleeve having at least one slot and an initial internal diameter that increases as the cannula

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is inserted into said sleeve such that said sleeve clamps against the cannula.

10. The apparatus as set forth in claim 1 wherein said mechanism includes a first threaded spindle and a second threaded spindle rotatable about an axis relative to said first threaded spindle, said first threaded spindle having a lip portion for limiting axial displacement of said first threaded spindle relative to said second threaded spindle.

11. The apparatus as set forth in claim 10 wherein said second threaded spindle has a radially extending shoulder portion for engaging said lip portion of said first threaded spindle.

12. An apparatus for supporting an endoscope for viewing a surgical site in a patient during surgery on the patient, the endoscope extending through a cannula into the patient, said apparatus comprising:

a base; and

a cannula retainer for engaging an outer surface of the cannula to secure the cannula to said cannula retainer, said cannula retainer including a

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said base being rotatable relative to said sleeve about an axis of the cannula.

14. The apparatus as set forth in claim 12 further including a sleeve retainer for supporting said base and said sleeve, said sleeve retainer including a ring member press fit onto an end portion of said sleeve.

15. The apparatus as set forth in claim 12 wherein said sleeve has at least one slot and an initial internal diameter that increases as the cannula is inserted into said sleeve such that said sleeve clamps against the cannula.

17. The apparatus as set forth in claim 15 wherein said sleeve includes an annular bead disposed on an inner surface of said sleeve, said annular bead being adapted to secure the cannula to said sleeve.

18. An apparatus for supporting an endoscope for viewing a surgical site in a patient during surgery on the patient, the endoscope extending through a cannula into the patient, said apparatus comprising:

a base for supporting the endoscope;

a sleeve for engaging an outer surface of the cannula; said base and said sleeve being relatively rotatable about an axis of the cannula; and

a sleeve retainer for supporting said sleeve and said base, said sleeve retainer including a member press fit onto an end portion of said sleeve.

20. The apparatus as set forth in claim 18 wherein said sleeve is a part of a cannula retainer, said cannula retainer further including a split ring for engaging a first groove on the outer surface of the cannula and for engaging a second groove on an inner surface of said sleeve.

21. The apparatus as set forth in claim 18 further including a connection between said base and said sleeve, said connection enabling said base to rotate relative to said sleeve about the axis of the cannula, said connection including an index mechanism with parts interposed between said base and said sleeve for retaining said base at incremental relatively rotated positions relative to said sleeve.

22. The apparatus as set forth in claim 18  
wherein said sleeve retainer comprises an electrically

insulating material electrically insulating said sleeve.

23. The apparatus as set forth in claim 18 wherein said sleeve has an initial internal diameter that increases as the cannula is inserted into said sleeve such that the sleeve clamps against the cannula.

24. The apparatus as set forth in claim 18 further including a mechanism for axially adjusting the endoscope relative to said base, said mechanism including a first threaded spindle and a second threaded spindle rotatable about an axis relative to said first threaded spindle, said first threaded spindle having a lip portion for limiting axial displacement of said first threaded spindle relative to said second threaded spindle.

25. The apparatus as set forth in claim 24 wherein said second threaded spindle has a radially extending shoulder portion for engaging said lip portion of said first threaded spindle.



26. An apparatus for supporting an endoscope for viewing a surgical site in a patient during surgery on the patient, the endoscope extending into a cannula and into the patient, said apparatus comprising:

a base for supporting the endoscope;

a sleeve for engaging an outer surface of the cannula, said base and said sleeve being relatively rotatable about an axis of the cannula; and

a support arm for securing said sleeve to a support structure, said support arm including a first portion for connection to said sleeve and a second portion for interconnecting said first portion and the support structure, said first portion comprising an electrically insulating material electrically insulating said sleeve from said second portion.

27. The apparatus as set forth in claim 26 further including a first part to be fixed to the endoscope and a second part adjustably engaging said base, said first part and said second part being vertically movable together relative to said base.

28. The apparatus as set forth in claim 27 wherein said sleeve has an annular retaining lip for

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engaging an upper end of the cannula and limiting axial movement of the cannula relative to said sleeve, said annular retaining lip extending radially inward toward the axis of the cannula.

29. The apparatus as set forth in claim 26 wherein said sleeve is part of a cannula retainer, said cannula retainer further including a split ring for engaging a first groove on the outer surface of the cannula and a second groove on an inner surface of said sleeve.

30. The apparatus as set forth in claim 29 further including a connection between said base and said sleeve, said connection enabling said base to rotate relative to said sleeve about the axis of the cannula, said connection including an index mechanism with parts interposed between said base and said sleeve for retaining said base at incremental relatively rotated positions relative to said sleeve.

31. The apparatus as set forth in claim 26 wherein said sleeve has an annular bead and at least one slot such that an initial internal diameter of said

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annular bead can increase as the cannula is inserted into said sleeve and subsequently spring back toward said initial diameter.

32. An apparatus for supporting an endoscope for viewing a surgical site in a patient during surgery on the patient, said apparatus comprising:

a base having a guide portion;

a first part to be fixed to an endoscope, a second part movable in said guide portion and connected with said first part, said first and second parts being movable together relative to said guide portion;

a screw mechanism connected to said second part and operable to move said first and second parts relative to said guide portion; and

a pin for securing said second part to said screw mechanism, said pin being press fit into recesses in both said second part and said screw mechanism.

33. The apparatus as set forth in claim 32 further including a cannula retainer engaging an outer surface of a cannula and securing said cannula to said cannula retainer, said cannula retainer including a sleeve for receiving said cannula and a split ring for

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engaging a groove on said outer surface of said cannula.

34. The apparatus as set forth in claim 33 wherein said sleeve has an annular retaining lip for engaging an upper end of the cannula and limiting axial movement of the cannula relative to said sleeve.

35. The apparatus as set forth in claim 33 further including a connection between said base and said sleeve, said connection enabling said base to rotate relative to said sleeve about an axis of said sleeve, said connection including an index mechanism with parts interposed between said base and said cannula for retaining said base at incremental relatively rotated positions relative to said sleeve.

36. The apparatus as set forth in claim 32 further including a sleeve for engaging an outer surface of a cannula, said sleeve and said base being relatively rotatable about an axis of the cannula.

37. The apparatus as set forth in claim 36 further including a sleeve retainer for supporting said

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40. The apparatus as set forth in claim 39 wherein said sleeve is part of a cannula retainer, said cannula retainer further including a split ring for engaging a groove on the outer surface of the cannula.

41. The apparatus as set forth in claim 40 further including a connection between said base and said sleeve, said connection enabling said base to rotate relative to said sleeve about the axis of the cannula, said connection including an index mechanism with parts interposed between said base and said sleeve for retaining said base at incremental relatively rotated positions relative to said sleeve.

42. The apparatus as set forth in claim 39 further including a sleeve retainer for supporting said base and said sleeve, said sleeve retainer including a ring member press fit onto an end portion of said sleeve.

43. The apparatus as set forth in claim 39 further including a support arm for securing said sleeve to a support structure, said support arm

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including a first portion for connection to said sleeve and a second portion for interconnecting said first portion and the support structure, said first portion comprising an electrically insulating material electrically insulating said sleeve from said second portion.

44. An apparatus for supporting an endoscope for viewing a surgical site in a patient during surgery on the patient, said apparatus comprising:

a base having a guide portion;

a structure adapted to be fixed to the endoscope, said structure engaging said guide portion and being movable relative to said guide portion; and

a screw mechanism connected between said base and said structure, at least a portion of said screw mechanism being rotatable to slide said structure relative to said guide portion to change a position of the endoscope relative to the patient,

said screw mechanism including a first threaded spindle having female threads and a second threaded spindle rotatable about an axis relative to said female threads in said first threaded spindle, said first threaded spindle having a lip portion for

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limiting axial displacement of said first threaded spindle relative to said second threaded spindle.

45. The apparatus as set forth in claim 44 wherein said structure comprises a first part adapted to be fixed to the endoscope and a second part vertically movable relative to said guide portion, said first and second parts being movable together relative to said guide portion.

46. The apparatus as set forth in claim 44 further including a sleeve engaging an outer surface of a cannula, and a split ring supported by said sleeve for engaging a groove on said outer surface of said cannula.

47. The apparatus as set forth in claim 46 further including a connection between said base and said sleeve, said connection enabling said base to rotate relative to said sleeve about an axis of said cannula, said connection including an index mechanism with parts interposed between said base and said cannula for retaining said base at incremental relatively rotated positions relative to said cannula.

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48. The apparatus as set forth in claim 46 further including a sleeve retainer for supporting said base and said sleeve, said sleeve retainer including a ring member press fit onto an end portion of said sleeve.

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